

5031 is formed in the unit sleeve 501 adjacent to the first connecting inlet 503 and an air chamber 5041 is formed in the unit sleeve 501 adjacent to the second connecting inlet 504. A central passage 505 is formed between the oil chamber 5031 and the air chamber 5041. A connecting outlet 506 is transversely formed at an enlarged chamber 5051 provided in the central passage 505.

The piston 507, which is coaxially disposed in the central passage, has one end located in the oil chamber 5031. The other end of the piston 507 provides an interior air passage 510. The central portion of the piston 507 forms an annular groove 5070 for engaging with a holding ring 5071 which is located at the enlarged chamber 5051 of the central passage 505. Thus the motion of the piston 507 is limited between the two ends of the enlarged chamber 5051. The spring 511 is disposed between the holding ring 5071 of the piston 507 and one inner end of the central chamber 5051.

A first hose 60a is connected between the pneumatic power source 10 and the second connecting inlet 504 of the automatic controlling apparatus 50. A second hose 60b is connected between the connecting outlet 506 of the automatic controlling apparatus 50 and the air inlet 302 of the first end cover 34 of the pneumatic oil pump 30. A third hose 60c is connected between the oil outlet 323 of the second end case 32 of the pneumatic oil pump 30 and the first connecting inlet 503 of the automatic controlling apparatus 50. A fourth hose 60d is connected between the oil inlet 322 of the second end case 32 of the pneumatic oil pump 30 and the oil inlet unit 90 which is inserted into the oil reservoir 20. At least an outlet hose 60e is connected between the oil outlet unit 70 and the third hose 60c by means of a joint 61.

Referring to FIG. 1, the safety valve 40 is disposed on said third hose 60c between the pneumatic oil pump 30 and the oil outlet unit 70 for controlling the oil to flow in one way only, that is from the oil outlet 323 of the pneumatic pump 30 to the oil outlet unit 70 that prevents any oil flowing reverse back to the pneumatic pump 30.

As illustrated by FIG. 1, compressed air is discharged from the air compressor 10 to the second connecting inlet 504 of the automatic controlling apparatus 50 via the first hose 60a. Then, the compressed air passes through the interior air passage 510 of the piston 507 to the enlarged chamber 5051 of the central passage 505 and flows from the connecting outlet 506 to the air inlet 302 of the pneumatic oil pump 30 via the second hose 60b. The vane spindle 305 is driven to rotate when the compressed air from the air inlet 302 flows through the air inlet passage 304 of the air seat 303 to the air grooves 3242 of the sleeve 324. That compressed air will be discharged from the pneumatic oil pump 30 to the environment via the air hole 3241 of the sleeve 324 and the air outlet 301a of the first end case 31 of the pneumatic oil pump 30. The gear end portion 311 of the second end shaft 308 of the rotating vane spindle 305 then drives the three gears 312 to rotate around the interior gear portion 3131 of the gear ring 313. Thus the drive shaft 315 is driven to rotate about its axis by the three gears 312. Meanwhile, the driving head 319 of the drive shaft 315 is also driven to rotate within the oil seat 320 to achieve pumping effect.

The oil inlet unit 90 is a tubular head or simply an opening end of the fourth hose 60d which is immersed in the oil reservoir 20. The oil reservoir 20 is an oil tank, according to the present embodiment, which provides

new oil for pumping to any desired apparatus, such as the engine of an vehicle.

Due to the pumping effect of the rotating driving head 319 in the oil seat 320, oil in the oil reservoir 20 is sucked to the oil inlet 322 of the second end case 32 of the pneumatic oil pump 30 via the fourth hose 60d. The oil is then pumped out from the oil outlet 323 of the pneumatic oil pump 30 to the third hose 60c which is linked to the first connecting inlet 503 of the automatic controlling apparatus 50 and the oil outlet unit 70, an oil gun, via the outlet hose 60e for oil discharging.

When the oil outlet unit 70 is switched on for oil discharging, the spring 511 pushes the piston 507 towards the oil chamber 5031 that enables the compressed air to flow from the second connecting inlet 504 to the connecting outlet 506 via the interior air passage 505 which is maintained opened by placing its exit in the enlarged chamber 5051 in order to keep the pneumatic oil pump 30 actuate. When the oil outlet unit 70 is switched off to close the outlet, the pressure of the continued flowing oil will be increased because of the closed outlet. That compressed oil flows into the oil chamber 5031 of the automatic controlling apparatus 50, presses the piston 507 towards the second connecting inlet 504 and compressed the spring 511. The exit of the interior air passage 510 is then closed by the interior wall of the interior air passage 505. So that no air can be flown out through the connecting outlet 506. Thus, the compressed air supply to the pneumatic oil pump 30 is cut that the pneumatic oil pump 30 is turned off automatically to stop the pumping of oil.

If the oil outlet unit 70 is switched on again, the compressing pressure to the spring 511 is released. The piston 507 is pressed to move back towards the first connecting inlet 503 by the spring 511. The interior air passage reopens, which enables the compressed air to flow to and activate the pneumatic oil pump 30 again automatically.

As shown in FIG. 4, the stand 80 of the pneumatic oil lubricator comprises a base 81 which has four wheels 82 spacedly attached to its bottom which receives the pneumatic oil pump 30 and the automatic controlling apparatus 50. A handle frame 83 of predetermined height is secured to one side of the base 81. On the base 81, three pressing clamps 84 are mounted triangularly to define a central receiving area therebetween for receiving the oil reservoir 20. Each pressing clamp 84 comprises a press board 841 which can be pushed forward or pulled backward by a conventional screwing unit 842, so that the central receiving area can be adjusted to adapt the oil reservoir 20 of different sizes. Furthermore, the oil reservoir 20 can be clamped firmly by adjusting the three press board 841 of the pressing clamp 84 to press on the exterior surface of the oil reservoir 20. At the upper portion of the handle frame 83, an adjustable support 85 is mounted thereon for holding on the upper portion of the oil reservoir 20. The base further comprises a hose holder 86 at one side, which provides a plurality of hose catches 861 to receive those hoses 60 in position for easy transportation.

According to present invention disclosed above, the pneumatic oil lubricator can activate or stop the pneumatic oil pump 30 automatically without the utilizing of electricity or electric equipment when the oil outlet unit (the oil gun) is switched on or switched off. Moreover, the pneumatic oil pump 30 has smaller size and simplified structure with lower cost than the conventional.

I claim: